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Effect of Increasing Military-Related Load Carriage Magnitude on Dynamic Postural Stability in Men and Women

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The impact of load carriage on dynamic postural stability affects the survivability of the Warfighter by influencing performance capabilities and injury incidence. Further, sex may interact with the relationship between load carriage and dynamic postural stability to further compromise survivability. **PURPOSE**: To investigate the effect of load carriage magnitude on dynamic postural stability of men and women and its relationship to jumping ability. **METHODS**: 32 subjects (16 men, 16 women) were investigated for maximum jump height and dynamic postural stability. Dynamic postural stability was assessed by subjects jumping a horizontal distance of 40% their height over a 30cm hurdle, landing on one leg on a force plate (sample rate = 1200 Hz). 3 trials were completed for 3 load conditions: +0, +20 and +30% body weight (BW). Dynamic postural stability was determined from ground reaction force data during landings, by calculation of the dynamic postural stability index (DPSI). Maximum jump height was assessed by subjects performing 3 countermovement jumps (sample rate = 1000 Hz). Two-way repeated measures ANOVA were used to compare mean DPSI scores between sexes and conditions ($\alpha = 0.05$). Pearson's Correlation Coefficients were used to determine the relationship between jump height and change in DPSI scores between conditions ($\alpha = 0.05$). **RESULTS**: Load condition significantly affected DPSI ($F = 100.304$, $p = 0.001$). DPSI scores increased between the 0% (0.359 ± 0.041), 20% (0.396 ± 0.034) and 30% (0.420 ± 0.028) BW load conditions. No significant effect of sex on DPSI was found ($F = 0.131$). No significant sex by load interaction on DPSI was found ($F = 0.393$). No significant correlations were found between jump height and change in DPSI scores between conditions. **CONCLUSIONS**: Increased load was found to negatively affect dynamic postural stability, most likely as a result of modifying the demands of the task. Therefore, the dynamic postural stability of men and women changes comparably in response to increased load carriage magnitude. Future research should focus on the effects of load on dynamic postural stability under higher loads and during more military-specific tasks.

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